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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,587	11/18/2003	Robert J. Atmur	024.0021	6265

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EXAMINER

WRIGHT, ANDREW D

ART UNIT	PAPER NUMBER
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3617

DATE MAILED: 06/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/716,587

Applicant(s)

ATMUR, ROBERT J.

Examiner

Andrew Wright

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/18/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "104" has been used to designate both the impeller and the control signal in figure 1A. Corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 4, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Wuhrer (US 4,509,925). Wuhrer discloses a vessel that necessarily has an engine to drive the propeller shaft (5). A propeller (1) is coupled to the drive shaft and comprises hub (3) and blades (7). Wuhrer calls the propulsion device a propeller in a Kort nozzle, but it constitutes an impeller in the way that applicant is using the term. The blades are pivotal with respect to the hub about axis (P) shown in figure 1. Wuhrer discloses that the blades are pivoted by any suitable adjusting mechanism, and teaches a hydraulic actuation system. The hydraulic system is a control system. The pressure

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in the lines of the hydraulic system is a control signal. The hydraulic system is coupled to the impeller.

4. Claim 2, Wuhrrer shows four blades, since all are pivotable then an opposing pair is pivotable.

5. Claim 4, there are four blades and all are pivotable, so an even number of blades is pivotable.

6. The limitations of claim 11 are present in Wuhrrer as described above.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wuhrrer (US 4,509,925). Wuhrrer discloses four blades, but does not disclose an odd number of blades. Variable pitch propellers with odd number of blades are known and common. It is within the range of knowledge of the skilled artisan to change the number of blades of a propeller. Different numbers of blades affect hydrodynamic performance parameters such as acceleration and top speed. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Wuhrrer by using a three bladed propeller instead of a four bladed propeller. The motivation would

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be to optimize the hydrodynamic characteristics for the propeller depending upon the intended use.

9. Claims 1, 5-8, and 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wuhrer (US 4,509,925) in view of Peterson et al. (US 5,028,210) and Wham et al. (US 4,648,345). Wuhrer discloses that the blades are pivoted by any suitable adjusting mechanism, and teaches a hydraulic actuation system. Wuhrer does not disclose the details of the control system recited in claims 5-8. Peterson shows a variable pitch propeller that comprises cyclic propeller blade pitch angle variation that results in a thrust vector in any of three degrees of motion. Peterson teaches that this obviates the need for control surfaces and rudders. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Wuhrer by using a collective and cyclic blade pitch control system as suggested by Peterson. The motivation would be to reduce drag by eliminating unneeded control surfaces and rudders. Peterson shows a mechanical control system that uses linkages and swash plates to control the blade pitch angle. Wham teaches that an electronic system is beneficial to a mechanical system because it can vary blade pitch cyclically and collectively in accordance with any real continuous function and not just sinusoidally. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Wuhrer by using an electronically controlled collective and cyclic blade pitch control system as taught by Wham. The motivation would be to provide the greater maneuverability as taught by Wham.

10. Regarding claims 5-8, Wuhrrer modified in view of Peterson and Wham has an electronic control system that sends electronic control signals to the blades to control blade pitch. The control system will necessarily adjust the phase and magnitude of the control signal according to desired maneuvering. Wham discloses the use of sinusoidal wave forms. Wham discloses that any real continuous function can be used. The skilled artisan would recognize that changing the function, as suggested by Wham, could change the hydrodynamic performance of the propeller. A saw-tooth waveform is a known and common function. It would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify Wuhrrer by using a sawtooth waveform. The motivation would be to optimize the hydrodynamic performance of the propeller.

11. The limitations of claim 12 are present in Wuhrrer modified in view of Peterson and Wham as described above.

12. Regarding claims 13-16, Wuhrrer modified in view of Peterson and Wham does not disclose the recited method steps. The methods steps, however, are inherent in the making and use of the modified invention of Wuhrrer. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to devise the claimed method steps based upon the making and use of the modified invention of Wuhrrer. The motivation would be to make and use the modified invention of Wuhrrer.

13. The limitations, including equivalents of the means plus function limitations, of claim 17 are present in Wuhrer modified in view of Peterson and Wham as described above.

14. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duncan et al. (US 6,332,818) in view of Wuhrer (US 4,509,925). Duncan shows a vessel with two propellers, each having a hub connected to a drive shaft and variable pitch blades. A control system crates control signals to control the blade pitch. The propellers can rotate in opposite directions. The blade pitch of one propeller can be controlled independently of the other propeller, implying a separate control signal for each. Duncan does not disclose that the propellers are impellers. Wuhrer shows a variable pitch propeller with a Kort nozzle around the blades, thereby effectively constituting an impeller. Kort nozzles have many known uses, one of which is to protect the blades from damage cause by striking objects, another of which is to protect humans and animals from being struck by the blades. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to add nozzles around the propellers of Duncan. The motivation would be to protect the blades from damage cause by striking objects and to protect humans and animals from being struck by the blades.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hull ('794) discloses a vehicle with an impeller disposed within the vehicle, the impeller having variable pitch blades. Gongwer ('192) shows a vehicle

with an impeller disposed outside and aft of the vehicle, and discusses compensating for impeller torque. Davies et al. ('904) shows a vehicle with a tunnel impeller with variable pitch blades. Treaster et al. ('054) shows an underwater vehicle with attitude control in the form of multiple impellers and ducts.

16. Any inquiry concerning this communication should be directed to examiner Andrew D. Wright at telephone number (703) 308-6841. The examiner can normally be reached Monday-Friday from 9:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, S. Joe Morano, can be reached at (703) 308-0230. The fax number for official communications is 703-872-9306. The fax number directly to the examiner for unofficial communications is 703-746-3548.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Andrew D. Wright
Patent Examiner
Art Unit 3617

AW 5/19/04